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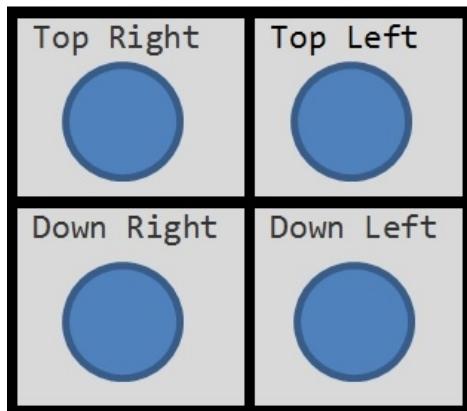
## Project#04 Solar Tracker

Tracking sunlight using 4 photo-resistors and 2 servos.

Origination of the 4 photo-resistors:

Using cardboard, makes a long 3D cross with 4 sections. Place it in the center to separate 4 photo-resistors.

Attach the whole unit to the vertical servo.



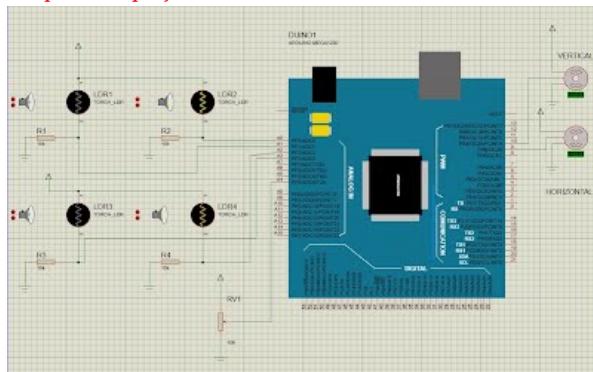
I use [LynxmotionPan and Tilt Kit](#) for 2D motion



Circuit:

Notice the connection of the photo-resistor. The brightest light on the LDR, higher value is read from the analog pin.

[See previous project.](#)



SPL, OLED VU  
Meter  
Project#20  
OLED Spectrum  
Analyzer using  
Fixed-point  
FFT; FHT on  
free-running  
mode  
Project#21  
Create own PCB  
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Code:

```
1 // Reference from:  
2 // http://www.instructables.com/id/Arduino-Solar-Tracker/?ALLSTEPS  
3 // http://fritzing.org/projects/arduino-2-dof-sun-tracker  
4 //  
5 // Pins setting:  
6 // pin D9 = horizontal servo  
7 // pin D10 = vertical servo  
8 // pin A0 = Top Left photoresistor  
9 // pin A1 = Top Right photoresistor  
10 // pin A2 = Down Left photoresistor  
11 // pin A3 = Down Right photoresistor  
12  
13 #include <Servo.h>  
14  
15 //create servo objects to control servos  
16 Servo horizontalServo;  
17 Servo verticalServo;  
18 int val_Vertical=90; // set initial value of vertical servo at the middle pos  
19 int val_Horizontal=90; // set initial value of horizontal servo at the middle pos  
20  
21 // LDR pin connections  
22 // name = analogpin;  
23 const int LDR_TL = 0; //LDR top left A0  
24 const int LDR_TR = 1; //LDR top right A1  
25 const int LDR_DL = 2; //LDR down left A2  
26 const int LDR_DR = 3; //LDR down right A3  
27 int avg_Top = 0; // average value top  
28 int avg_Down = 0; // average value down  
29 int avg_Left = 0; // average value left  
30 int avg_Right = 0; // average value right  
31  
32 // Use Potentiometer 10k (value doesn't matter) for Tolerance Settings  
33 const int TolerancePin = 4; // pin A4  
34 int Tolerance = 1;  
35  
36 void setup(){  
37     // servo connections  
38     horizontalServo.attach(9);  
39     verticalServo.attach(10);  
40     // serial output  
41     Serial.begin(9600);  
42 }  
43  
44 void loop(){  
45     read_potentiometer();  
46     read_LDRs();  
47     adjust_Servos();  
48     delay(15);  
49 }  
50  
51 void read_potentiometer(){  
52     // Use Potentiometer for Tolerance Settings  
53     Tolerance = analogRead(TolerancePin)/4;  
54     Serial.print("Tolerance: ");  
55     Serial.println(Tolerance);  
56 }  
57  
58 void read_LDRs(){  
59     // scale down 10-bit analogRead to the angle of the servo in degrees, 0 to 180  
60     int val_TL = map(analogRead(LDR_TL),0,1023,0,179);  
61     int val_TR = map(analogRead(LDR_TR),0,1023,0,179);  
62     int val_DL = map(analogRead(LDR_DL),0,1023,0,179);  
63     int val_DR = map(analogRead(LDR_DR),0,1023,0,179);  
64     avg_Top= (val_TL + val_TR) / 2; // average value top  
65     avg_Down= (val_DL + val_DR) / 2; // average value down  
66     avg_Left = (val_TL + val_DL) / 2; // average value left  
67     avg_Right = (val_TR + val_DR) / 2; // average value right  
68     Serial.print("LDR top left: ");  
69     Serial.println(val_TL);  
70     Serial.print("LDR top right: ");  
71     Serial.println(val_TR);  
72     Serial.print("LDR down left: ");  
73     Serial.println(val_DL);  
74     Serial.print("LDR down right: ");  
75     Serial.println(val_DR);  
76 } //end read_LDRs  
77  
78 void adjust_Servos(){  
79 }
```

```

80 int divert = avg_Top - avg_Down;      // check the difference of up and down
81 int dhoriz = avg_Left - avg_Right;   // check the difference of left and right
82
83 // Using the tolerance value stop servo seeking
84 // Check Vertical check if the difference is in the tolerance else change vertical
85 if (-1*Tolerance > divert || divert > Tolerance){
86     if (avg_Top > avg_Down){
87         //adjust Vertical Servo Down
88
89         val_Vertical = ++val_Vertical;
90         if (val_Vertical > 179){
91             val_Vertical = 179;
92         }
93     }
94     else if (avg_Top < avg_Down){
95         //adjust Vertical Servo Up
96         val_Vertical= --val_Vertical;
97
98         if (val_Vertical < 1){
99             val_Vertical = 1;
100        }
101    }
102    verticalServo.write(val_Vertical);
103 }
104 //Check Horizontal check if the difference is in the tolerance else change horizontal
105 if (-1*Tolerance > dhoriz || dhoriz > Tolerance){
106     if (avg_Left > avg_Right){
107         //adjust Horizontal Servo Left
108         val_Horizontal = --val_Horizontal;
109
110         if (val_Horizontal < 1){
111             val_Horizontal = 1;
112         }
113     }
114     else if (avg_Left < avg_Right){
115         //adjust Horizontal Servo Right
116         val_Horizontal = ++val_Horizontal;
117
118         if (val_Horizontal > 179){
119             val_Horizontal = 179;
120         }
121     }
122     else if (avg_Left == avg_Right){
123         // nothing
124     }
125     horizontalServo.write(val_Horizontal);
126 }
127
128 Serial.print("Servo Horizontal: ");
129 Serial.println(val_Horizontal);
130 Serial.print("Servo Vertical: ");
131 Serial.println(val_Vertical);
132 } // end adjust servos

```